IS 6733
Deep Learning on Cloud Platforms

Lecture 6

Multi-layer Perceptron (MLP)

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Multi-Layer Perceptron (MLP)

- MLP refers to neural networks with at least one hidden layer
- Hyperparameters
  - Neural network structure
    - Number of hidden layers and hidden units
    - Activation function
    - Weight initialization
    - Dropout rate
  - Training
    - Learning rate
    - Epoch, iterations, and batch size
    - Optimizer algorithm
    - Loss function

Table 4.1. Choosing the right last-layer activation and loss function for your model (view table figure)

Problem type	Last-layer activation	Loss function
Binary classification	sigmoid	binary_crossentropy
Multiclass, single-label classification	softmax	categorical_crossentropy
Multiclass, multilabel classification	sigmoid	binary_crossentropy
Regression to arbitrary values	None	mse
Regression to values between 0 and 1	sigmoid	mse or binary_crossentropy

Softmax

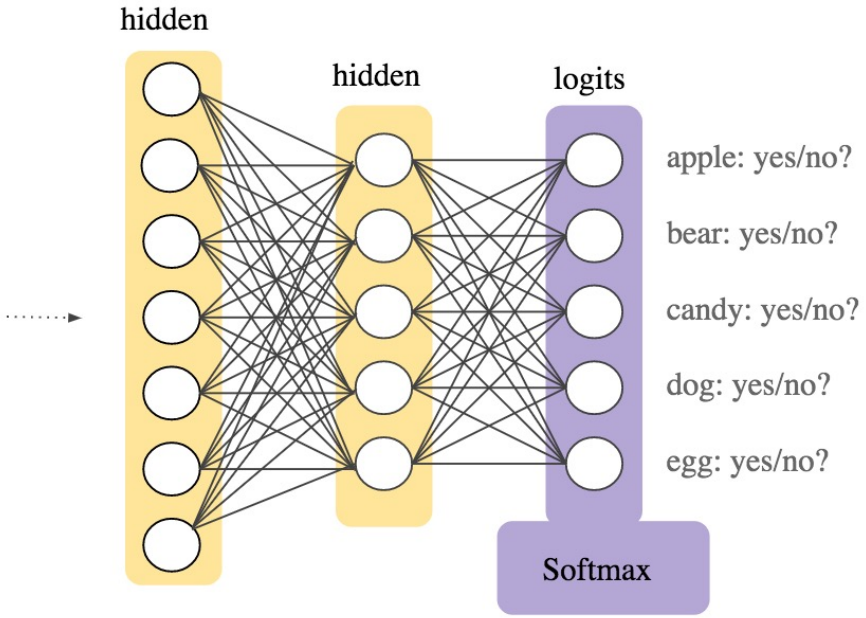
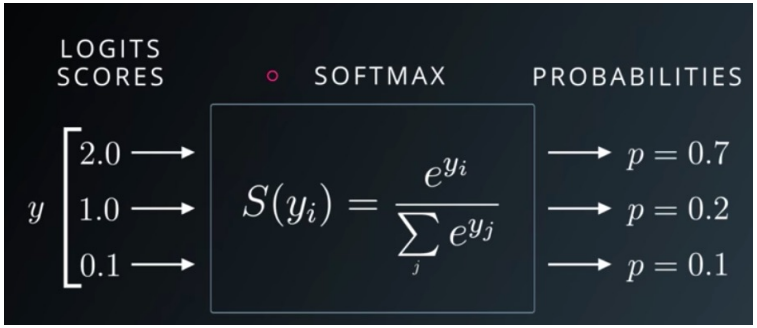


Figure 2. A Softmax layer within a neural network.



https://developers.google.com/machine-learning/crash-course/multi-class-neural-networks/softmax

A first look at a neural network using Keras (Revisit)

https://colab.research.google.com/drive/13cof4XUULbUqO0s5h-cd17FskWjpyMkm

MLP Examples

- Classifying movie reviews: a binary classification example
  - https://colab.research.google.com/drive/1ZNFLcYv6wLF3Q1IEewRU9qULsEOt-Alf
- Classifying newswire: a multiclass classification example
  - https://colab.research.google.com/drive/1izjcv4J_l0c440FPLMw3UVT1uTe9F0QK
- Predicting house prices: a regression example
  - https://colab.research.google.com/drive/1q5r-ubwJd_6rk9rBB4N4OVpHNiyltTCu

Additional References

- Chapter 3.4~3.6 of [T2]